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IS 6609-5 (1972): Methods of test for commercial blasting explosives and accessories, Part V: Safety fuses [CHD 26: Explosives and Pyrotechnics]



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Indian Standard

METHODS OF TEST FOR COMMERCIAL
BLASTING EXPLOSIVES AND ACCESSORIES

PART V SAFETY FUSES

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 1

Indian Standard

METHODS OF TEST FOR COMMERCIAL BLASTING EXPLOSIVES AND ACCESSORIES

PART V SAFETY FUSES

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(Continued on page 2)

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(Continued from page 1)

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Indian Standard

METHODS OF TEST FOR COMMERCIAL BLASTING EXPLOSIVES AND ACCESSORIES

PART V SAFETY FUSES

0. FOREWORD

0.1 This Indian Standard (Part V) was adopted by the Indian Standards Institution on 2 August 1972, after the draft finalized by the Explosives and Pyrotechnics Sectional Committee had been approved by the Chemical Division Council.

0.2 The explosives industry in India was for a considerable time confined only to the ordnance factories. However, during the last decade other manufacturing units have come into existence. It was, therefore, considered necessary to formulate specifications for various commercial explosives and explosive accessories produced by the industry. Before laying down specifications, it was felt necessary to prepare standard methods of test.

0.3 Testing of commercial explosives is of utmost importance for ensuring their safety during transport and handling, stability in storage and adequate life and performance under all conditions of use. Test methods included in this standard cover these aspects for all the groups of explosives under consideration.

0.4 Depending upon the country of origin and type of the explosive stores, a large number of test methods are in vogue, which though similar in nature, differ in minor details of experimental procedure and expression/interpretation of results.

0.5 It is a difficult task to select a particular method as the best. Therefore, choice has been effected in favour of those methods for which sufficient experience and experimental data is available and which are mutually acceptable to all concerned, namely, the producers, the inspectors and the consumers in the field.

0.6 The test methods cover both general and permitted explosives and accessories like detonators, detonating fuses and safety fuses. They do not cover all items but include those which are currently used and manufactured in the country. The methods are covered under different parts of this standard:

Part I Gun powder (black powder)

Part IIA Explosives, general

Part IIB Explosives, permitted

Part III Detonators, general, and permitted

Part IV Detonating fuses

Part V Safety fuses

0.7 In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS : 2-1960*.

1. SCOPE

1.1 This standard (Part V) prescribes the methods of test for safety fuses.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definition shall apply.

2.1 Safety Fuse— It is an accessory used for blasting which burns at a specified rate and does not explode and which does not contain its own means of ignition and which is of such construction and strength and contains a core of gun powder in such quantity that the burning of such fuse will not communicate laterally with like fuses when kept in contact.

3. TEST METHODS

3.1 Measurement of Diameter— The diameter shall be measured with the help of a micrometer or calipers. The instrument shall be preferably a ratchet type or spring loaded. Take one metre length of sample and measure the diameter at three different places and at each place in two positions right angle to each other. Record the results giving the diameter in millimetres.

3.2 Test for Burning Time— Cut one metre length of the safety fuse under test, taking care to discard about 5 cm from the exposed end. Ignite at one end and at the same time start the stop-watch. Stop the watch simultaneously with the emergence of a spit of flame from the other end. Note the time to the nearest second.

3.3 Water Immersion Test (for Waterproof Fuses)— Take two metre length of the fuse from the sample to be tested discarding about 5 cm of the exposed ends of the sample. Seal the ends of the fuse using molten bitumen so as to prevent ingress of moisture through the ends. Immerse

*Rules for rounding off numerical values (*revised*).

the fuse longitudinally in a tank at a depth of 15 cm of water at $27 \pm 2^{\circ}\text{C}$ with the ends of the fuse protruding above the water surface, for a period of six hours. Remove the fuse after immersion and wipe off water from the surface. Take one metre length from the middle discarding 50 cm from both ends and determine the burning time as prescribed in 3.2. Record the results giving the burning time in s/m. In case of burning failure record the results accordingly.

3.4 Accelerated Ageing Test

3.4.1 For High Temperature — Bend about 1.2 m length of safety fuse into a coil of 75 mm diameter on a mandrel. Keep it in a hot cabinet at about 60°C for a period of 48 h. At the end of this period, examine it visually and determine the burning time as prescribed in 3.2.

3.4.2 For Low Temperature — Take about 1.2 m length of safety fuse and bend it into a coil of 75 mm diameter on a mandrel. Keep it in a deep freeze cabinet at -10°C for 24 h. At the end of this period, unroll the fuse and examine for cracks. Determine the burning time of 1 metre length as specified in 3.2.

3.5 Gap Test — Cut two pieces of the fuse taking care to discard about 5 cm from the exposed end, one piece 100 mm long and the other 200 mm long. Insert both the pieces into a glass tube in which they are push fit and which has a hole in the region of gap between the fuse ends. Keep the fuse ends at a distance of 2.5 cm. Ignite the longer piece of the fuse and observe whether the spit from its enclosed end is able to ignite the shorter piece.

3.6 Lateral Transmission Test — Take a 5 m length of safety fuse, wind it on a suitable mandrel of 30 cm diameter in such a way that the individual turns of the coil are in close contact side by side, with the fuse ends clamped suitably on the mandrel. Light one end of the fuse on the mandrel and see whether any lateral transmission is taking place. Note the burning time of the coil and record the results giving the burning time and whether there was any lateral transmission.

INDIAN STANDARDS
ON
RAW MATERIALS FOR EXPLOSIVES

IS:

- 301-1963 Potassium nitrate for explosives and pyrotechnic compositions (*revised*)
- 438-1961 Aluminium powder for explosives and pyrotechnic compositions
- 708-1970 Potassium chlorate, technical (*first revision*)
- 2012-1961 Red phosphorus
- 2307-1962 Magnesium powder for explosives and pyrotechnic compositions
- 4396-1967 Barium nitrate for explosives and pyrotechnic compositions
- 4668-1967 Ammonium nitrate for explosives
- 5670-1970 Lead thiocyanate for explosive and pyrotechnic compositions
- 5671-1970 Strontium nitrate for pyrotechnic compositions
- 5713-1970 Manganese dioxide for explosive and pyrotechnic compositions
- 5731-1970 Antimony sulphide for explosive and pyrotechnic compositions

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Coal carbonization products	Pigments and extenders
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Dye intermediates	Ready mixed paints and enamels
Electroplating chemicals	Rubber and rubber products
Explosive and pyrotechnic materials	Soaps and other surface active agents
Fertilizers	Tanning materials and allied products
Fillers, stoppers and putties	Thermal insulation materials
Footwear	Thinners and solvents
Glass and glassware	Varnishes and lacquers
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Laboratory glassware thermometers and related apparatus	Unclassified
Lac and lac products	
Leather, leather goods and leather dressings	

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